

**AMENDMENTS TO THE CLAIMS**

Please amend claims 1, 2, 4, and 5. No new matter is believed to be introduced by the aforementioned amendments. The following listing of claims will replace all prior versions and listings of claims in the application.

1. **(Currently Amended)** A method for performing OTDM, said method comprising the following steps:

a) generating  $n$  bit streams of approximately  $B$  Gb/s from respectively  $n$  tunable laser beams having respectively wavelengths of  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$ ;

b) generating from said  $n$  bit streams  $n$  group velocity dispersed bit streams by introducing group velocity dispersion into said  $n$  bit streams;

c) combining said  $n$  group velocity dispersed bit streams into a composite bit stream of approximately  $nB$  Gb/s; and

d) in response to misalignment of bits within said composite bit stream, tuning said  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$  to create ~~the proper~~ OTDM time differential between consecutive bits within said composite bit stream.

2. **(Currently Amended)** The method of Claim 1, further comprising the following steps:

e) generating a single-wavelength composite bit stream of approximately wavelength  $\lambda_v$  and  $nB$  Gb/s by operating on said composite bit stream with a wavelength converter; and

f) in response to misalignment of bits within said single-wavelength composite bit stream, tuning said  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$  to create ~~the proper~~ OTDM time differential between consecutive bits within said single-wavelength composite bit stream.

3. **(Original)** An OTDM transmitter, comprising:

a)  $n$  channels of bit streams  $D_1, D_2, \dots$  and  $D_n$  having respectively wavelengths of  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$ , wherein for  $j = 1$  to  $n$ , the  $j$ -th channel comprises:

j1) a tunable laser source  $S_j$  providing a bit stream  $B_j$  of approximately  $B$  Gb/s; and

j2) a group velocity dispersive element  $E_j$  coupled to said  $S_j$ , introducing group velocity dispersion into said  $B_j$  to generate said  $D_j$ ;

b) a combiner coupled to said  $n$  channels and adapted to optically combine said  $D_1, D_2$ , and  $D_n$  into a composite bit stream of approximately  $nB$  Gb/s; and

c) a wavelength converter coupled to said combiner and adapted to convert said composite bit stream into a single-wavelength composite bit stream of approximately  $nB$  Gb/s to be transmitted through an optical link, wherein OTDM time differential can be created between consecutive bits of said single-wavelength composite bit stream by tuning  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$ .

4. **(Currently Amended)** A method for performing OTDM transmission, said method comprising the steps of:

a) generating  $n$  bit streams of approximately  $B$  Gb/s from respectively  $n$  tunable laser beams having respectively initial wavelengths of  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$ ;

b) generating  $n$  group velocity dispersed bit streams by introducing group velocity dispersion into said  $n$  bit streams;

c) combining said  $n$  group velocity dispersed bit streams into a composite bit stream of approximately  $nB$  Gb/s;

d) generating a single-wavelength composite bit stream of wavelength  $\lambda_v$  by wavelength converting said composite bit stream with a wavelength converter;

e) in response to misalignment of bits within said single-wavelength composite bit stream, tuning said  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$  to create ~~the proper~~ OTDM time differential between consecutive bits within said single-wavelength composite bit stream; and

f) transmitting said single-wavelength composite bit stream by launching said single-wavelength composite bit stream into an optical transmission link.

5. **(Currently Amended)** A WDM system, comprising:

a) m OTDM channels, wherein for  $k = 1$  to m, the k-th OTDM channel comprises:

kl) n channels  $V_{k1}, V_{k2}, \dots$  and  $V_{kn}$  providing respectively bit streams  $D_{k1}, D_{k2}, \dots$  and  $D_{kn}$  having respectively wavelengths of  $\lambda_{k1}, \lambda_{k2}, \dots$  and  $\lambda_{kn}$ , wherein for  $j = 1$  to n, the j-th channel  $V_{kj}$  comprises:

kj 1) a tunable laser source  $S_{kj}$  providing a bit stream  $B_{kj}$  of approximately B Gb/s; and

kj2) a group velocity dispersive element  $E_{kj}$  coupled to said  $S_{kj}$ , introducing group velocity dispersion into said  $B_{kj}$  to generate said  $D_{kj}$ ;

k2) a combiner coupled to said n channels and adapted to optically combine said n bit streams into a composite bit stream  $U_k$ ;

k3) a wavelength converter coupled to said combiner and adapted to convert said composite bit stream into a single-wavelength composite bit stream  $A_k$  of wavelength  $\lambda_{vk}$ , wherein ~~the proper~~ OTDM time differential can be created between consecutive bits of said  $A_k$  by tuning  $\lambda_{k1}, \lambda_{k2}, \dots$  and  $\lambda_{kn}$ ; and

b) a WDM multiplexer coupled to said m OTDM channels, with said WDM multiplexer adapted to generate a composite optical signal with a data rate of approximately  $mnB$  Gb/s.

6. **(Original)** An OTDM subsystem for performing optical time-division-multiplexing, said OTDM subsystem comprising:

a) n channels of bit streams  $D_1, D_2, \dots$  and  $D_n$  having respectively wavelengths of  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$ , wherein for  $j = 1$  to n, the j-th channel comprises:

j 1) a tunable laser source  $S_j$  providing a bit stream  $B_j$  of approximately B Gb/s; and

j2) a group velocity dispersive element  $E_j$  coupled to said  $S_j$ , introducing group velocity dispersion into said  $B_j$  to generate said  $D_j$ ;

b) a combiner coupled to said N channels and adapted to optically combine said  $D_1, D_2,$  and  $D_n$  into a composite bit stream of approximately  $nB$  Gb/s, wherein OTDM time differential can be created between consecutive bits of said composite bit stream by tuning  $\lambda_1, \lambda_2, \dots$  and  $\lambda_n$ .

7. **(Previously Presented)** The method according to claims 2 or 4, wherein return-to-zero (RZ) format is used in generating bit streams.

8. **(Previously Presented)** The method according to claims 1, 2 or 4, wherein said B Gb/s is 10 Gb/s, and wherein said n is 4.
9. **(Previously Presented)** The method according to claims 1, 2 or 4, wherein said B Gb/s is 40 Gb/s, and wherein said n is 4.
10. **(Previously Presented)** The device according to claims 3 or 5, wherein said wavelength converter is a vertical lasing semiconductor optical amplifier (VLSOA), and wherein said single wavelength is generated from the vertical lasing of said VLSOA.
11. **(Previously Presented)** The device according to claims 3 or 5, wherein said wavelength converter uses four-wave mixing.
12. **(Previously Presented)** The device according to claims 3 or 5, wherein said wavelength converter is a MZ-SOA.
13. **(Previously Presented)** The device according to claims 3 or 5, wherein said wavelength converter is a SOA.
14. **(Original)** The method of Claim 1, wherein said n bit streams are generated by modulating respectively n CW tunable laser sources.
15. **(Original)** The method of Claim 1, wherein said n bit streams are generated respectively by n directly modulated tunable laser sources.
16. **(Original)** The OTDM transmitter of Claim 3, wherein for said  $j=1$  to n, said  $S_j$  in said j-th channel is a CW tunable laser that is coupled to a modulator  $M_j$ , said  $M_j$  modulating a laser beam  $L_j$  generated by said  $S_j$  into said  $B_j$ .
17. **(Original)** The OTDM transmitter of Claim 3, wherein for said  $j=1$  to n, said  $S_j$  in said j-th channel is a tunable laser that is directly modulated.

18. **(Original)** The method of Claim 4, wherein said  $n$  bit streams are generated by modulating respectively  $n$  CW tunable laser sources.
19. **(Original)** The method of Claim 4, wherein said  $n$  bit streams are generated respectively by  $n$  directly modulated tunable laser sources.
20. **(Original)** The WDM system of Claim 5, wherein for  $k=1$  to  $m$  and  $j = 1$  to  $n$ , said tunable laser source  $S_{kj}$  in said  $j$ -th channel  $V_{kj}$  is a tunable CW laser source that is coupled to a modulator  $M_{kj}$ , said  $M_{kj}$  modulating a laser beam  $L_{kj}$  produced from said  $S_{kj}$  into said stream  $B_{kj}$ .
21. **(Original)** The WDM system of Claim 5, wherein for  $k=1$  to  $m$  and  $j = 1$  to  $n$ , said tunable laser source  $S_{kj}$  in said  $j$ -th channel  $V_{kj}$  is a tunable laser that is directly modulated.
22. **(Original)** The OTDM subsystem of Claim 6, wherein for said  $j=1$  to  $n$ , said  $S_j$  in said  $j$ -th channel is a CW tunable laser that is coupled to a modulator  $M_j$ , said  $M_j$  modulating a laser beam  $L_j$  generated by said  $S_j$  into said  $B_j$ .
23. **(Original)** The OTDM subsystem of Claim 6, wherein for said  $j=1$  to  $n$ , said  $S_j$  in said  $j$ -th channel is a tunable laser that is directly modulated.